PLANT PROTECTION BULLETIN

A Publication of the

WORLD REPORTING SERVICE ON PLANT DISEASES AND PESTS

VOL. I, No. 9 JUNE, 1953

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

ROME, ITALY

FAO PLANT PROTECTION BULLETIN

is issued as a medium for the dissemination of information received by the World Reporting Service on Plant Diseases and Pests, which has been established in accordance with the provisions of the International Plant Protection Convention, 1951. It publishes reports on the occurrence, outbreak and control of pests and diseases of plants and plant products of economic significance and related topics, with special reference to current information.

This Bulletin is issued monthly in English, French and Spanish. Twelve numbers comprise a volume. Subscription rates, U. S. $ 3.00 or 15/– per year. Single numbers, U. S. $ 0.30 or 1/6.

FAO, in publishing this Bulletin, does not assume responsibility for statements and views expressed in the reports herein included.

The citation for this publication is FAO Plant Protection Bulletin or, in abbreviation, FAO Pl. Prot. Bull.

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Subscriptions and other business correspondence should be addressed to Documents Sales Service, FAO, Viale delle Terme di Caracalla, Rome, Italy.

FAO Plant Protection Bulletin

VOL. I, No. 9 A Publication of the JUNE 1953

World Reporting Service on Plant Diseases and Pests

Plant Disease Situation in the United States

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Lettuce Mosaic in California and Arizona

MOSAIC caused important losses in the late fall and early winter crops of lettuce in the Imperial Valley, California, and the Yuma Valley, Arizona, during the 1952–1953 growing season. The disease has been observed in commercial fields and experimental plots in these inland valleys for many years. Prior to 1952 it seldom caused important losses, although small losses, 1 to 3 percent, often resulted from use of infected seed. Secondary infection was at a minimum because the crop was grown during the cool winter months when temperature and other conditions were unfavorable for aphid build–up and movement.

Observations in commercial fields in the Imperial Valley, in late November and early December 1952, indicated that mosaic was much more prevalent than usual. The proportions of infected plants varied greatly in different fields. No secondary spread was observed in a field well–isolated from cotton and other field crops and in fields of spring lettuce planted in November. Sporadic infection from infected seed was observed in all of these fields. Mosaic plants were most abundant in fields planted in late September and October for late fall and early winter harvest and located in the center of the cropping area. In some of these fields 25 to 50 percent of the plants were diseased.

Symptoms were more severe in plants attacked while young. These were often stunted and distorted. Head formation and growth were delayed. Plants attacked as the heads matured were less severely injured and often showed mild symptoms. Necrosis was not observed while the temperatures remained high but became severe after the first frost.

Mosaic was prevalent in the Yuma Valley during this same period, infection approaching 100 percent in certain fields. Some fields were so severely damaged by the disease that they were abandoned before harvest. Symptoms were more severe in fields planted for winter harvest than in earlier fields. The difference apparently resulted from differences in stage of growth at the time of infection. Non–thinned fields planted during November for spring harvest contained mosaic plants as a result of use of infected seed, but they were apparently free of secondary infection.

The unusual prevalence of lettuce mosaic in late fall and early winter lettuce in the Imperial and Yuma Valleys during the 1952–53 season appeared to be correlated with an unusual abundance of aphids and other insects during October and early November. Temperatures averaged about 10° F. above normal during this period. It is probable that these unseasonably high temperatures were an important contributing factor in the build–up and activity of the insect population during the fall.

Apparently, all the commercial varieties of lettuce grown for fall and winter culture in the areas under observation are equally susceptible to the disease. Also, no consistent

differences in the amount of infection were evident when fields planted with seed from different sources were compared.

If losses from lettuce mosaic continue to be severe in crops planted for fall and early winter harvest, it may be economical for growers and seedsmen to consider a program for producing mosaic-free seed.

Downy Mildew on Oats in the South

Records indicate that downy mildew (*Sclerospora macrospora* Sacc.) was causing damage in oat fields in the Delta region of Mississippi as early as 1936, although it was first reported in 1941. Since then, the disease has been reported in other southern states, in Louisiana in 1947, in Arkansas and Georgia in 1951, and in Alabama, Florida, and Tennessee in 1952. Outside of the South downy mildew has been found on oats in several States over a wide range, including Colorado and Idaho in the West and Indiana, Michigan, and Minnesota in the central region. This distribution suggests that downy mildew may be much more widespread but overlooked. The development of the disease is not yet completely understood. The seedling stage is very difficult to diagnose and the death of young plants caused by *Sclerospora macrospora* may have been attributed to other causes. The disease is most severe on fertile soil of high moisture content, where yields are usually good anyway, and this may partly account for the slight attention that it has attracted. Another difficulty in recognition is that diseased plants in many cases are so distorted that they are often mistaken for weeds or other grasses.

The disease was present in the South in 1951 but it was not possible then to make a comprehensive survey at the time when symptoms could most easily be recognized. The best time is said to be between ripening and harvest of normal, healthy oat plants. Diseased plants remain green for several days after normal ripening time and can then be readily observed.

In early June of 1952 a survey was made to determine the distribution and economic importance of downy mildew in the mid-south. In Mississippi, 85 percent of the oat fields examined contained from only a trace to as many as 25 percent infected plants. In spots in certain fields infection was almost 100 percent. Downy mildew was severe enough to cause significant losses in yield in twelve counties in the Delta area. It is estimated that loss in this area of the state amounted to more than 200,000 bushels of grain. Yields were generally good, however, in spite of the losses from downy mildew. In another twelve counties no field examined had more than 2 percent infected plants.

The survey was more limited in the other southern states. One of the few fields examined in Alabama contained à uniform 60 percent infection. Nearby fields showed from 5 to 10 percent. The disease was observed in three Alabama counties. Downy mildew was found in eight counties in Arkansas with infection up to as much as 7 percent and some reduction in yield in some fields. In Louisiana, where harvest was practically complete, downy mildew was found in four parishes. At one location in one parish 15 percent infected plants occurred in one field and other fields were affected to a less extent. In the other parishes no fields with high soil moisture were examined and damage was slight.

The distribution of diseased plants within a field varied considerably. Rather uniform infection, which was sparse or considerable, was observed in some fields. Others showed uniform light infection except in low areas where nearly all plants were diseased. In a few fields infection apparently was limited to a narrow strip along the edge adjacent to areas in which susceptible wild grasses were growing.

Experiment and observation indicate two sources of initial inoculum. One is contamination of seed oats from affected fields by oospores. The second is soil contamination by oospores, which may persist in debris from diseased tissue of infected small grains or susceptible wild grasses.

In addition to the death of seedlings and the loss of production in infected mature plants, downy mildew presents a considerable storage problem. Harvested oats from infected fields contain a large amount of the green tissue of infected plants.

Results of the survey show that downy mildew is a factor to be reckoned with

in oat production in the South, particularly the Delta region of Mississippi, Louisiana, and Arkansas. In 1952 it was the most important disease of oats in Mississippi. It may assume even greater importance in the Delta area of the State, with a probable increase in acreage planted to wheat, rice, and perhaps barley.

Johnson grass (*Sorghum halepense*), one of the most widely distributed grasses in Mississippi, was infected by a species of *Sclerospora* at State College and in the Delta area in the fall of 1952. Many diseased plants were found along the edge of fields in which oats had been observed during the previous spring to be infected with *S. macrospora*. Symptoms on Johnson grass included a very slight thickening and barely perceptible roughening of infected leaves. Neither distortion of leaves nor malformation of the inflorescence, characteristic of *S. macrospora* infection on oats, was observed. Infected leaves died somewhat prematurely and infected plants seemed to be differentially killed by the first seasonal frost. Oospore measurements of the Johnson grass pathogen were within the range for *S. macrospora* but identification is not yet positive.

Sclerospora on Johnson grass has not been reported previously in Mississippi, and there does not seem to be any other record of a downy mildew on this host. The significance of abundant occurrence on this widespread grass is obvious, if the fungus proves to be parasitic on any of the small grains grown in the Delta area of Mississippi, Arkansas, and Louisiana.

Observations on the Mediterranean Fruit Fly on Citrus in Tripolitania (Libya) in 1952/53

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THE Mediterranean fruit fly (*Ceratitis capitata* Wied.) is probably the insect which causes the greatest damage to fruit culture in North Africa. However, the nature and intensity of its attacks vary greatly with the location of the orchard. For its normal development, the insect requires a relatively high humidity. It develops best along the coast and in regularly irrigated areas. Other factors affecting the degree of infestation are: proximity to centers of infestation, physiological condition of the tree, microclimate, wind, etc.

Host and Seasonal Effects on Infestation

The development of the larva is influenced by the host. Attacks are always very serious on peaches, apricots and pears, since most of the punctures made by the insect contain normally developed larvae which make the fruit useless for consumption. In the case of citrus, the percentage of punctured fruits containing larvae in the pulp varies with the variety and the season.

When fly pun tures in citrus fruits were examined microscopically, many were found sterile, the female having perforated the skin of the fruit without ovipositing. Normally the female makes an oviposition gallery between the mesocarp and the epicarp and lays a group of eggs, either in the bottom of the gallery or on its wall. All eggs, however, do not hatch because the essential oils in the epidermal cells are toxic and inhibit egg development. Moreover, the plant reacts to the puncture by developing around the oviposition gallery a scleritised tissue which often forms a barrier impassable to the newly hatched larvae. Nevertheless, a large proportion of eggs develop normally and give rise to larvae which penetrate through the mesocarp. But very few succeed in penetrating into the pulp, most of them dying at the base of the mesocarp.

Different species of citrus vary in their resistance to attacks by the fly. On lemon, for instance, the writer has never observed larvae penetrating into the pulp. On mandarin and pummelo, the percentage of wormy fruits is usually rather high.

At the beginning of the season, when the fruits are still green or just turning yellow, there are more sterile punctures. The percentage of eggs which fail to develop and the mortality of young larvae are also very high. The physical texture and probably the chemical composition of the epidermal tissues of the fruit change during the process of maturation. The tissues of the mesocarp, while compact in the beginning, become more or less spongy at later stages. The gummy secretion and the scleritisation of the cells around the oviposition gallery also take place more vigorously in the initial stage of maturation. It appears, therefore, that the resistance of the fruit diminishes with maturity.

Several hundred citrus fruits punctured by this insect from the Tripoli area were examined with a binocular microscope about a week after harvest to determine the nature of the damage. The results given in Table 1 indicate that the percentage of sterile punctures tends to decrease when the fruit approaches maturity, as in the case of Demmi orange, and varies with the variety. They also show that before the end of November very few larvae could develop normally in citrus fruits. The penetration and development of the larvae in the pulp was practically nil in oranges and very little in the grapefruit.

Table 1. – *Results of examining fly punctures on citrus fruits during August–November 1952*

Variety	Date of collection	Percentage of fly punctures				Total number of punctures examined
		Sterile	With abortive eggs	With larvae		
				Dead	Alive	
Oranges						
Demmi	7 Aug.	65	32	3	0	100
	28 Oct.–28 Nov.	22	34	44	0.65	304
Portuguese	28 Oct.–28 Nov.	13	42	45	0	103
Navel	28 Oct.–28 Nov.	22	10	68	0	154
Grapefruit						
Triomphe	28 Oct.–28 Nov.	28	13	58	1.3	159

In order to obtain results more closely approaching natural conditions, oranges and grapefruits punctured by the fly were collected periodically, kept in the laboratory, and examined about a month after picking. Table 2 summarizes the results obtained from these examinations.

These observations show that during the period from November to January the fly developed more freely in grapefruits and pummelos with 10 to 50 percent of punctured fruits containing well developed larvae in the pulp. Real infestation on oranges during the same period, however, was very low,

Table 2. – *Results of examining citrus fruits infested by the fly during November 1952 – January 1953*

Variety and date of picking	Number of fruits			Percentage of fruits with true infestation
	With larvae	Without larvae	Total	
Grapefruits				
Triomphe, Nov.	30	260	290	10
Marsh Seedless, Jan.	18	30	48	38
Total	48	290	338	24
Pummelo, Jan.	32	32	64	50
Oranges				
Demmi, Nov.	1	103	104	1.0
Dec.	15	259	274	5.5
Jan.	13	510	523	2.5
Feb.	1	333	334	0.3
Total	30	1 205	1 235	2.5
Portuguese, Nov.	0	28	28	0
Dec.	0	246	246	0
Jan.	3	201	204	1.5
Feb.	2	80	82	2.4
Total	5	555	560	0.8
Navel, Jan.	3	113	116	2.6

being up to 5.5 percent only. The variety Demmi appears to be more susceptible to the fly than the Portuguese. The observations for the Navel orange were too limited to enable any conclusions to be drawn. However, it is of interest that in 1949 and 1950 the writer observed on the La Trappe estate, near Algiers, that of 945 Washington and Thompson Navel oranges collected from November to mid–January only 1.4 percent of punctured fruits contained larvae.

Most citrus fruits are harvested in Tripolitania by the end of February. In some orchards, however, the fruits of late varieties of oranges and grapefruits remain on the trees until the end of April or the beginning of May. During this period in 1953 no fresh fly punctures were observed. The flight of the Mediterranean fruit fly ceased at the beginning of January and had not started again by the end of April.

Effects of Host Conditions on Infestation

The nature of the attacks of the Mediterranean fruit fly can vary greatly even in the same orchard, and on the same variety. The vigorous trees are generally less attacked than the weak ones. At Tagiura, for example, on 15 December there were 8 percent punctured fruits on vigorous Demmi oranges and 13 percent on the weaker trees.

Fruits located on the southern side of the tree are more susceptible to attack than those on the northern side or in the center of the tree.

The fly apparently attacks fruits only when they have reached a certain degree of physiological maturity.

Infestation in Different Areas

From mid–December to the beginning of January, i. e., after the main flights of the fly, the main citrus growing areas in Tripolitania were surveyed to determine approximately the extent of attacks and damage. Two to four hundred fruits per variety in each orchard were examined from trees located on the border and in the center of the plot. The results from a total of about 20,000 fruits are summarized in Table 3.

These observations confirm that the attacks differ with location and variety. The insect prevailed in the areas of Sorman, Zavia, Tripoli, La Mellaha and Tagiura while orchards located more in the interior, such as Bianchi, Suani, Azizia, Castel Benito and certain areas on the eastern coast, such as at Garabulli and Castel Kiar, were almost free.

In general, the Demmi orange was found to be more susceptible than the variety Portuguese, while Navel orange was always heavily attacked. Up to the beginning of December, grapefruits were very lightly infested, but fruits picked later were heavily attacked. The variety Marsh Seedless was less susceptible than the variety Triomphe or pummelo.

Conclusions

From the above general observations on the damage caused by the Mediterranean fruit fly on citrus in Tripolitania, the following conclusions can be drawn:

(1) During the 1952/53 season the attack of the fly extended from the end of October to the beginning of January but larvae were observed in the pulp only from the end of November to the beginning of February.

(2) The extent of the damage varies with the location of the orchards. The heaviest attacks were observed in Sorman, Zavia and Tagiura. In Zanzur and Tripoli the attacks were of less importance. All the groves in the interior, in Bianchi and South of Tripoli and in Garabulli and Castel Kiar were practically free from infestation.

(3) Citrus varieties vary in susceptibility. Generally fruits of Navel and Demmi varieties are punctured more often than Portuguese and Dolce Vanilla. Grapefruits are heavily attacked at the end of the season.

(4) Laboratory observations show that the majority of the eggs and larvae fail to develop normally inside the fruit. At the beginning of the season there were more sterile punctures.

(5) Punctured oranges that had been kept in the laboratory for a month were very rarely found with larvae penetrating into the pulp. On the contrary, the grapefruits were very often wormy.

Table 3. – *Extent of infestation in main citrus regions in Tripolitania during mid–December 1952 – early January 1953*

Region	Percentage of fruits infested on		
	Demmi	Portuguese	Other varieties
West coast			
Sorman	52	8	—
	42	5	Tarocco 34
Zavia	92	47	Dolce Vanilla 27
	76	25	33
Zanzur	17	0	Navel 55
			Dolce Vanilla 6
			Grapefruit 0
Bianchi	2	2	—
Tripoli and vicinity			
Sidi Mesri	38	12	Navel 65
	35	29	—
Collina Verde	31	6	Tarocco 12
	22	—	—
	13	—	Jaffa 13
Porta Azizia	20	—	Grapefruit 1
	46	5	—
	10	—	—
East coast			
La Mellaha	62	—	—
	23	23	—
Tagiura	17	—	—
	88	—	—
	96	95	Grapefruit 86
Garabulli	0	1	Calabraise 0
Castel Kiar	0	0	Dolce Vanilla 0
Zaviet	—	—	Dolce Vanilla 0
South of Tripoli			
Tripoli Suani			
At 6 km.	3	4	—
7 km.	15	4	Valencia Late 24
10 km.	1	0	—
11 km.	1	1	—
12 km.	0	0	—
Suani	0	0	Dolce Vanilla 0
	0.2	1	Grapefruit 0
Suani–Castel Benito	3	—	Navel 7
	0	0	—
Castel Benito	4	—	Bella Donna 1
	0	0	—
Azizia	0	0	—

The writer believes that these observations are of importance from the economical and technical points of view. Should citrus culture be extended in Tripolitania, preference should be given to the areas and varieties less susceptible to attack by this insect.

To the writer's knowledge, phytosanitary regulations concerning the exportation and importation of citrus fruits take into account only the external appearance of citrus with the result that all fruits bearing fly punctures are refused entry. From the observations made, it is obvious that the risk of introducing the fly through punctured citrus depends on the season, the area of production and the variety. It would facilitate international trade without increasing the risk of pest introduction if phytosanitary requirements for the importation of citrus could be reduced to an assurance of inspection by a competent inspector.

Finally, it should be noted that numerous experiments carried out in Tripolitania and abroad indicate that good control of the Mediterranean fruit fly can be achieved by the use of insecticides.

Plant Disease Problems in Central America

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THE region commonly known as Central America extends from the southern border of Mexico to the northern border of Colombia on the South American continent. Six countries are included: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. The climate is affected by constant trade winds from the Atlantic, by winds from the Pacific and by the high mountains with volcanoes in the interior. There is a wet and a dry season, each of approximately six months duration in the interior. There are semi–arid areas with rainfall less than 75 cm. annually unevenly distributed, and also wet areas with rainfall more than 200 cm. annually, fairly well distributed in the coastal lowlands.

These circumstances permit the growing of many different kinds of crops and create many plant disease problems. The average farmer does not recognize the parasitic origin or contagious nature of plant diseases and losses are generally accepted as the effect of unfavorable weather. Not more than six laboratories are engaged in the investigation of plant diseases in this region.

The brief account of plant disease problems which follows is presented not as a comprehensive survey by crops or countries, but rather as a review of the most important diseases contributing to low quality and quantity of crop production.

Virus and Bacterial Diseases

Virus diseases are a menace to producers of the important subsistence crop, beans, and to growers of such vegetables as tomatoes, peppers and cucurbits. Tobacco is of poor quality and gives low yields in a number of areas due to mosaic. Losses are sustained on imported varieties of potatoes from leaf curl, but little virus trouble is seen among the native varieties. A new virus disease of maize, called stunt, is spreading rapidly and may become serious.

Bacterial diseases of three types are prevalent, the most important of which is the wilt disease of tomatoes and potatoes, caused by *Pseudomonas solanacearum*. The same wilt is found in some plantings of eggplants and peppers. The second type

is the soft–rot disease, due to *Erwinia carotovora*, inflicting losses in lettuce, carrots, cabbage and peppers and cucurbit fruits. No. The third is black–leg, caused by *Xanthomonas campestris*, which produces losses in cabbage fields during wet weather.

Diseases Due to Phycomycetous and Ascomycetous Fungi

Fungi of the genus *Phytophthora* constitute a serious problem in the production of many crops. The most important example is the annual destruction of potato fields by late blight, *Phytophthora infestans*, and the frequent loss of tomato crops due to the same fungus. Cacao crops are greatly reduced, sometimes by more than 50 percent, by pod rot, due to *Phytophthora palmivora*. The same fungus is responsible for bud rot of coconuts, but little is known of the number of trees lost annually in coastal areas. Other trees seriously damaged by Phytophthoras include the avocado, which is affected by *Phytophthora cinnamomi*, quinine, affected by *P. cinnamomi* and *P. parasitica*, and citrus which suffers from gummosis due to *P. parasitica*.

Downy mildews shorten the productive period of certain crops, such as cucurbits and lettuce, affected respectively by *Pseudoperonospora cubensis* and *Bremia lactucae*. Downy mildew of grape, *Plasmopara viticola*, is also a common and serious problem.

Diseases caused by various members of Ascomycetes create problems in fruit production at higher altitudes. Peaches rot on the trees due to *Sclerotinia cinerea* and apples decay and shrivel through infection of *Physalospora obtusa*, which also produces serious cankers and leaf spotting on apple trees. Leaf curl, *Taphrina deformans*, has been found recently on peach trees. Other species of Ascomycetes which sometimes cause crop losses are *Gibberella saubinetii* on sorghum heads and *Pseudopeziza medicaginis* on alfalfa foliage.

Diseases Due to Basidiomycetes

Rusts are a serious problem to wheat growers at the higher altitudes. The most common, recurring annually, is leaf rust, *Puccinia rubigo–vera tritici*. Stem rust, *Puccinia graminis tritici*, is very serious in the fields wherever it occurs but it does not appear every year. Stripe rust, *Puccinia glumarum*, is less frequent than the other two mentioned. Crown rust, *Puccinia coronata*, is sometimes very severe on oats.

Leaf rust of maize, *Puccinia sorghi*, is never absent from fields. It is sometimes the cause of low yields because there are some highly susceptible lines among the extremely large number of maize varieties grown. Another rust, *Angiopsora pallescens*, is also prevalent on maize in Central America. It is an endemic species and its epidemiology is very little known except that it is a grave problem on lowland crops.

In addition to wheat and maize, bean yields are reduced by the rust fungus, *Uromyces phaseoli typica*, and peanut crops often fail due to *Puccinia arachidis*, during seasons that are unusually dry.

Smut diseases are found in cereals, but only in exceptional cases are the losses important. Sorghum fields have been found with 85 percent of the heads destroyed by covered kernel smut, *Sphacelotheca sorghi*. Head smut, caused by *Sphacelotheca reiliana*, has been responsible for the loss of 33 percent of the ears in some maize fields, but the common smut of maize, *Ustilago maydis*, is never very serious. Other smuts which appear sporadically in the region include loose smut of oats, *Ustilago avenae*, loose smut of wheat, *U. tritici*, covered smut of barley, *U. hordei*, and head smut, *Sphacelotheca reiliana*, on sorghum.

Few species of Basidiomycetes, besides rust and smut fungi, are the cause of important diseases in Central America. Leaf spotting due to *Omphalia flavida* and thread blight due to *Corticium koleroga* are two diseases which reduce yields of coffee appreciably and which should be investigated thoroughly.

Diseases Due to Imperfect Fungi

Scab diseases caused by the conidial stage of ascomycetous fungi are common. Apples are damaged by *Fusicladium dendriticum*, peaches by *Cladosporium carpophilum*, citrus by *Sphaceloma fawcetti*, and avocado by *S. perseae*.

The disease known as sigatoka, caused by *Cercospora musae*, which destroys the foliage of the banana and makes banana growing unprofitable, is one of the most serious diseases caused by Fungi Imperfecti. Another disease, which is more important than the average grower realizes, is the anthracnose disease of dry beans, caused by *Colletotrichum lindemuthianum*. There are also several other important anthracnose-producing fungi responsible for fruit spoilage, including *Colletotrichum gloeosporioides* on mango and avocado, *C. papayae* on papaya and *Gloeosporium musarum* on banana. Potato yields are greatly reduced in dry season plantings by *Alternaria solani* which also curtails tomato production. A related fungus, *Alternaria carotae*, reduces carrot yields by severely blighting the foliage.

Leaf blight, *Helminthosporium turcicum*, is serious on some lines of maize. Leaf spotting of rice, *H. oryzae*, is sometimes severe enough to affect production and is accompanied by nearly 100 percent seed infection when rainy periods coincide with maturing. Seedling blight of rice resulting from the use of this infected seed is common. Barley yields are greatly decreased by leaf blight due to *H. sativum*, which also affects wheat though to a lesser degree.

Peanut foliage may be blighted by *Cercospora personata* in the rainy season and peppers may become defoliated by *C. capsici*. Eggplants are subject to severe leaf spotting due to *Phomopsis vexans*, which also causes fruit rot. The productive period of cucurbits is shortened by the oidial stage of the powdery mildew, *Erysiphe cichoracearum*. A new disease of beans, caused by *Chaetoseptoria wellmanii*, is spreading rapidly and may become a menace to bean production.

Soil-Borne Diseases

Several soil–borne diseases are particularly important in Central America. Of the causative fungi, *Fusarium oxysporum* var. *cubense*, is the most hazardous because banana plantations invaded by it have soon to be abandoned. Thousands of acres of banana producing lands have already been lost. Coffee growers suffer annual losses of trees, sometimes up to 15 percent, from soil fungi such as *Rosellinia* spp. Coffee seedlings in nurseries are affected by soil fungi of the *Rhizoctonia solani* group, which also may be serious in low wet areas in bean and cotton fields. Vegetable growers suffer losses, during prolonged wet periods, in fields of carrots, lettuce and beans through the attack of *Sclerotium rolfsii*.

Nematode root knot, *Heterodera marioni*, is found in many vegetable gardens on a number of crops. However, no especial attention is given to the trouble, except in the case of tomatoes, which do not survive long in heavily infested garden soils.

Outbreaks and New Records

Malaya

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Onion Leaf Miner Becomes Established

FOLLOWING the report of the discovery of the onion leaf miner, *Dizygomyza cepae* Hering, in south Johore, information has just been received from the Acting Senior Entomologist, Federation of Malaya, that this fly has now been recorded from north Johore and therefore is gradually establishing itself throughout the Federation. According to Dr. V. P. Rao, of the Directorate of Plant Protection, Quarantine and Storage, New Delhi, this pest is not present in south India.

United States

Bureau of Entomology and Plant Quarantine, United States Department of Agriculture

Spread of Margarodes meridionalis

Specimens of a ground pearl collected beneath centipede grass during the fall of 1952 in the State of South Carolina have been tentatively identified as *Margarodes meridionalis* Morr. Positive identification could not be made due to the lack of adult females in the collection. This is the first record of this insect in South Carolina.

This small ground pearl, which was first discovered in Florida and Georgia in 1918, has now spread to the whole southern tier of states from South Carolina to Arizona, excepting Louisiana and New Mexico. The specifically reported hosts are common carpet grass (*Axonopus affinis*), Bermuda grass (*Cynodon dactylon*), and centipede grass (*Eremochloa ophurioides*). Since the insect has not been recognized from any other part of the world, it has been assumed that it is indigenous to the southern United States. It is, however, very closely related to *Margarodes papillosus* Green, described from India, so there is a possibility that it may have been introduced into the United States, as have other grass infesting coccids that have attracted attention in recent years. The possibility exists also that study of long series of specimens of the different stages of both of these species would indicate that they are identical, though present evidence, based on a very small sample of *M. papillosus*, does not lead to this conclusion.

There is evidence, based on a number of field observations and collections, that this insect can cause definite to serious damage to lawns and other grassy areas in the southern states. It appears that the extent of this damage may be influenced by certain ecological factors, such as extended periods with reduced rainfall, but such an opinion remains speculative in the absence of a critical study of the life history of the insect and of its relations with its host plants. An accurate assessment of capacity for damage is complicated in at least one area in northern Florida by the co-existence in infested plots of a second species of ground pearl, *Eumargarodes laingi* Jab., which is quite definitely believed to be introduced.

Preliminary attempts at insecticidal control of this insect have not thus far produced any satisfactory procedures for treatment when the insect becomes damaging.

Venezuela

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Record of Bean Bacterial Blight

Bean bacterial blight, caused by *Xanthomonas phaseoli* (E. F. Sm.) Dows., was erroneously recorded by Standen [1] as occurring in Venezuela. His record was based upon a report of Meredithy and Jeffers [2], which only mentions a bean disease very similar to bacterial blight. Actually this disease was not known to occur in Venezuela until 1952, when the writer found it in Maracay, causing extensive damage to common beans during the rainy season.

[1] STANDEN, J. H. *Host index of plant pathogens of Venezuela*. U. S. Dept. Agr. Pl. Dis. Reptr. Suppl. 212: 59–106. 1952.

[2] MEREDITHY, C. H. and W. F. JEFFERS. *Observaciones sobre algunas enfermedades de plantas económicas en la región de Los Andes*. Not. Fitopatol. Venezol. 2: 7–8. 1949.

Downy Mildew of Alfalfa

The alfalfa mildew, caused by *Peronospora trifoliorum* D By. has recently been found for the first time in the country. It caused great damage to the crop in the experimental plots of the Division of Zootecnia in Maracay, State of Aragua.

Eye Spot of Sugarcane

Although this disease is known to occur in almost every sugarcane growing country of the world, it has never been reported before in Venezuela. Recently it was found in sugarcane plantations at Guarico in the State of Lara, causing a great deal of loss. The causal organism is *Helminthosporium sacchari* (Breda de Haan) Butl.

PLANT QUARANTINE ANNOUNCEMENTS

Algeria (France)

An Order of 30 April 1953 relating to the importation and transit of plants and wood of chestnut tree was published in the Journal Officiel de l'Algérie, Vol. 27, No. 36, 5 May 1953. Under this Order, the importation of chestnut wood proceeding from countries contaminated by *Endothia parasitica*, the cause of the chestnut blight disease, shall be authorized only when the shipment is accompanied by a certificate attesting that the wood has been treated by steam sterilization for half an hour at a temperature of 80° C.

Federal Republic of Germany

Circular decree of the Ministry of Food, Agriculture and Forestry dated 24 October 1952, published in the Bundeszollblatt No. 46, 26 November 1952, provides that all shipments imported from foreign countries to West Berlin via the Federal Republic, which are subject to phytosanitary inspection, including potatoes, flower bulbs, cut flowers, nursery products, fresh fruit and fresh fruit products, etc., will be cleared at the point of entry into the Federal Republic. This is, however, not applicable to air shipments in transit through the Federal Republic without unloading or changing the carrier. The clearance will be carried out in accordance with regulations in force in the Federal Republic as regards the examination of health certificates, inspection, fumigation or other treatments.

As long as the authorities of the Eastern Zone require inter-zonal health certificates for shipments destined for West Berlin, a certificate of origin and health will be issued for such shipments at the points of entry, on Form No. 31 of the Biologischen Bundesanstalt für Land- und Forstwirtschaft.

Japan

The Plant Quarantine Law Enforcement Regulations, 1952, were partially amended on 13 March 1953.

Fresh fruits of tomatoes that are destined for Japan directly from the southwest islands north of latitude 36° N. are now exempted from prohibition, when accompanied with a certificate of origin.

Rice and its processed goods, the importation of which is prohibited from all foreign countries except Korea, Ryukyu Islands and Formosa, are more specifically stated to include "rice plants, rice straws, rice straw wares, paddy and chaff."

Spain

An Order of the Ministry of Agriculture of 14 March 1953, published in the Boletin Oficial del Estado, 31 March 1953, prohibits the importation into Spain of living plants, parts thereof, vegetables, fruits and seeds proceeding from countries in which the presence of the following insect pests and diseases of plants has been recorded :

Citrus black fly (*Aleurocanthus woglumi* Ashby)
Mexican fruit fly (*Anastrepha ludens* Loew)
Oriental fruit fly (*Dacus dorsalis* Hendel)
Melon fly (*Chaetodacus cucurbitae* Coq. = *Dacus cucurbitae* Coq.)
Tristeza (quick decline) of citrus
Pierce's disease of grapevine
Black spot of citrus (*Phoma citricarpa* McAlp.)

The official phytosanitary certificates required to accompany the shipments of such plants or parts of plants must state that the declared pests and diseases do not exist in the exporting country, regardless of the origin of the shipments. Even if they are accompanied by the certificates, such shipments are still subject to inspection by the National Phytopathological Service and to decisions therefrom.

Union of South Africa

Proclamation No. 77 of 27 March 1953, published in the Government Gazette No. 5053 on 17 April 1953, restricts the importation of pea seed and dead portions and products of the pea plant into the Union, by declaring the said material to be included in the definition of "plant" for the purposes of the Agricultural Pest Act of 1911, as amended. No "plant", as defined in the provisions of the Act, may be imported without written permit from the Department of Agriculture.

United States

Foreign Plant Quarantine No. 8 relating to the pink bollworm of cotton and the importation of foreign cotton and covers was revised effective

10 May 1953. It was published in the Federal Register Vol. 18, No. 69, 10 April 1953.

The purposes of this revision are to revise and consolidate into one document the foreign pink bollworm quarantine and the several orders and regulations relating to the importation of cotton lint, cotton and cotton wrappings, and cottonseed cake, meal and all other cottonseed products, except oil; to rescind the restrictions on the importation of cottonseed oil from Mexico; and to provide a basis for quarantine action against the introduction of the golden nematode of potatoes (*Heterodera rostochiensis*) and the flag smut of wheat (*Urocystis tritici*) in used bagging.

Under the revised regulations, conditional importation under safeguards of certain unfumigated cotton and cotton products (i.e., lint, linters and waste, cottonseed cake, cottonseed meal, and covers) will be allowed under permit fromcountries other than Mexico, when such products are destined to an approved mill or plant operating under an agreement to utilize the product in such a manner as to eliminate all possibility of pest introduction.

Certain established quarantine procedures are revised to conform to current experiences and to knowledge acquired as to hazards of pest introduction involved. Cotton bags or other covers which have been used for root crops, coming from countries in which the golden nematode is known to occur (including all European countries), may be entered subject to immediate treatment at the port of arrival according to such method as determined by the inspector. Bags or covers that have been used for wheat or wheat products from a country where the flag smut disease is known to occur will be subject to the same restriction.

Unfumigated cotton and covers that have been stored in certain areas in the United States for a period of 18 months will be released without further treatment.

Cotton and covers, including cottonseed and cottonseed hulls from designated areas of Mexico known to be free from the pink bollworm (i. e. the areas contiguous to cotton–producing areas in the United States, states on the West Coast, and Imperial Valley) may be entered under permit and regulations.

Cottonseed or seed cotton in small quantities may be imported for experimental or scientific purposes under permit.

NEWS AND NOTES

The Desert Locust

FAO Technical Advisory Committee on Desert Locust Control.

The third meeting of the above Committee, held in Rome, 21–24 April 1953, was attended by representatives of Egypt, France, India, Pakistan, U. K. and U.S.A. The Committee recorded that, despite many successful campaigns and greatly improved national and international action, which prevented any considerable destruction of crops, the Desert Locust plague has not diminished in intensity while geographically its extent is on the increase. Failure to obtain adequate control has been most serious in the Arabian Peninsula and the Committee gave particular attention to the manner in which campaigns there might be strengthened by more extended international action.

It was considered that this might best be achieved by national anti–locust organizations of all countries affected by the Desert Locust co-operating with the governments in the Arabian Peninsula and co-ordinated by FAO. The Committee requested FAO to work out an operational plan to explore with interested governments the possibility of creating an organizational form which will ensure continuity in financing and operations. The campaigns in Arabia during the winter of 1953 to the spring of 1954 are likely to be of especial importance.

On the technical side the Committee noted the promising results of the latest trials in aerial spraying of locust swarms in flight, a technique which may provide a valuable new approach to locust control. The treatment of egg fields with insecticides also shows considerable promise.

Material Assistance Provided by FAO.

By late spring, anti–locust equipment and supplies to the value of about US $ 410,000 had been purchased by FAO and distributed to strategic reserves and national control organizations. Most of this equipment has already been utilized to strengthen campaigns in Pakistan, Iran, Iraq, Jordan, Saudi Arabia, Yemen, Ethiopia, British Somaliland and Kenya. Insecticides have also been sent to Afghanistan and Libya to meet possible requirements.

Present Locust Situation.

By mid–June extendive breeding in the north of the Arabian Peninsua was concluded, but further breeding was taking place in Israel, Syria and Iraq. During early summer a large number of swarms, escaping from Iran or Oman, invaded Pakistan and penetrated into India. In Africa, recent breeding in the Somali Peninsula was effectively controlled but Eritrea and the Sudan were invaded by many swarms that escaped from Arabia. No marked extension of the plague in western Africa has yet taken place.

International Congress of Sugar Cane Technologists

The Eighth Congress of the International Society of Sugar Cane Technologists was held 20–24 April 1953 in Barbados, West Indies. It was attended by nearly three hundred delegates from twenty-three countries. Twelve technical papers were presented in the entomology section and nineteen papers in the pathology section. There were also papers on chemical weed control. In one of the sessions, the international aspects of sugar cane quarantine were discussed.

The proceedings of the Congress will be published and can be obtained from the General Secretary–Treasurer, Keith McCowan, British West Indies Sugar Association, Port of Spain, Trinidad..

Latin-American Meeting of Coffee Technicians

A Round Table of Coffee Technicians will be held at San José, Costa Rica, 17–26 September 1953, under the auspices of the Government of Costa Rica, in co-operation with FAO, the Inter–American Institute of Agricultural Sciences and the United States Foreign Agricultural Service. The Associated Coffee Growers of Central America, Mexico and the Carribean Islands will also take an important part in the meeting.

It has been realized in Latin America for over two decades that closer association should be established among the specialized coffee technicians, whose activities and interests have become rather localized because of economic and travel difficulties. The technicians, however, are facing a number of common problems which can be effectively solved only through co-operative efforts. For instance, in spite of the present favorable outlook, the coffee industry in the Western Hemisphere is constantly threatened by the danger of invasion of certain destructive diseases and

pests from the Eastern Hemisphere. Many scientists regard the eventual introduction of the two coffee rusts, *Hemileia vastatrix* and *H. coffeicola*, as almost certain, and there are neither adequate safeguards against this nor is there an efficient breeding program to ensure that rust resistant coffee varieties can be obtained if these rusts are eventually introduced. The danger of introducing the highly destructive sucking insects of the genera *Lygus* and *Antestia* and the African berry borer, *Stephanoderes hampei* also cannot be neglected. In addition, international action is urgently needed to eliminate the large annual losses inflicted by the American leaf spot disease due to *Mycena citricola* (*Omphalia flavida*). Equal attention must also be given to the dieback problems of both parasitic and physiological origin.

This Round Table is to provide an opportunity for the coffee technicians to exchange information on methods and results of their investigations and to develop a co-ordinating program to meet their multifarious problems.

For further information regarding this meeting, enquiries should be directed to Dr. F. L. Wellman, Organizing Secretary, Round Table Coffee Meeting, Apartado 17, Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica.

Roma - Tip. del Senato del dott. Giovanni Bardi

CEREAL BREEDING PROCEDURES

Recently published, this FAO Development Paper covers the whole field from the hybridization of the parent plants until a new variety is in commercial production. Methods of growing hybrid populations, systems of testing and recording of results, variety purification and increase of pure seed, as well as the analysis of data, are treated in detail. Various types of nurseries are described for the breeding of varieties resistant to plant diseases and insect pests, and tolerant to certain climatic factors such as frost.

Special features of the publication are the sixteen appendices which graphically illustrate planting plans, plot arrangements, the statistical progress of a cross, variety purification and other features of a cereal breeding program. The complexity involved in modern plant breeding methods and the consequent necessity of systematizing the procedures are clearly and impressively indicated. 122 pages, $1.25; 6/3.

LEGUMES IN AGRICULTURE

This uniqque collection of information on legumes, edited by R. O. Whyte, G. Nilsson-Leisner and H. C. Trumble, required the collaboration of specialists in every member country of FAO. No fewer than 111 contributors are acknowledged, and contributions from many more are mentioned in the text.

Nowhere else is such information available in one volume and, by pointing to the limitations in the data on economic botany, ecology and the biotic relationships of legumes it is hoped to encourage further research and experiment particularly in tropical and sub-tropical areas. An apprendix tabulates the species, indicating plant characteristics, climatic adaptation, soil adaptation, utilization, number of seeds per pound and seeding rates in pounds per acre. 368 pp., many illustrations, $ 3.00; 15s.

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